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Journal

Journal of the American College of Cardiology, 25(2)

ISSN

0735-1097

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Publication Date

1995-02-01

DOI

10.1016/0735-1097(95)92921-q

1004-54 Correlation of Intravascular Ultrasound Imaging with Histology of Normal and Diseased Pulmonary Arteries

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Intravascular ultrasound (IVUS) imaging of pulmonary arteries may provide useful clinical information to assess the degree of vascular disease. To investigate the feasibility of IVUS to identify the morphological changes associated with pulmonary vascular disease, 21 arterial segments (diameter range 2–6 mm) were obtained at autopsy and formalin fixed. IVUS imaging was performed with a 25 MHz mechanical catheter. Elastin and trichrome stains were used to grade the collagen and elastin content. IVUS and histology (Hist) images were digitized and measured. An intensity index was used to quantitate the IVUS appearance based on the average intensity per pixel and the standard deviation of intensities.

Results: Based on the histologic appearance, the arterial segments were categorized into normal (n = 6), mild hyperplasia (n = 9), and moderate hyperplasia (n = 6). Although the lumen size was easily identified, IVUS imaging revealed only a single layer appearance despite the presence of intimal hyperplasia. In distinction to coronary and peripheral arteries, IVUS did not identify a 2 or 3 layer appearance in the pulmonary arteries. This homogeneous IVUS pattern was due to the high elastin or collagen content of the intima, media and adventitia.

	HIST	IVUS	r	p
Lumen Perimeter	9.3 ± 2.8	10.4 ± 3.4	0.96	<0.0001
Lumen Area	7.5 ± 5.0	5 ± 6.7	0.97	<0.0001

	NL (n = 6)	Mild (n = 9)	Mod (n = 6)	P (ANOVA)
Intensity Index	0.58 ± 0.08	0.65 ± 0.11	0.76 ± 0.05	<0.01

Conclusion: IVUS accurately measures the lumen size of pulmonary arteries. It is unable to identify the degree of intimal hyperplasia because of the homogenous echogenicity across the different layers of the artery. The echo intensity index may be useful in distinguishing normal from diseased pulmonary arteries.